

# AFS Climate Change Outreach (General Public and Profession)

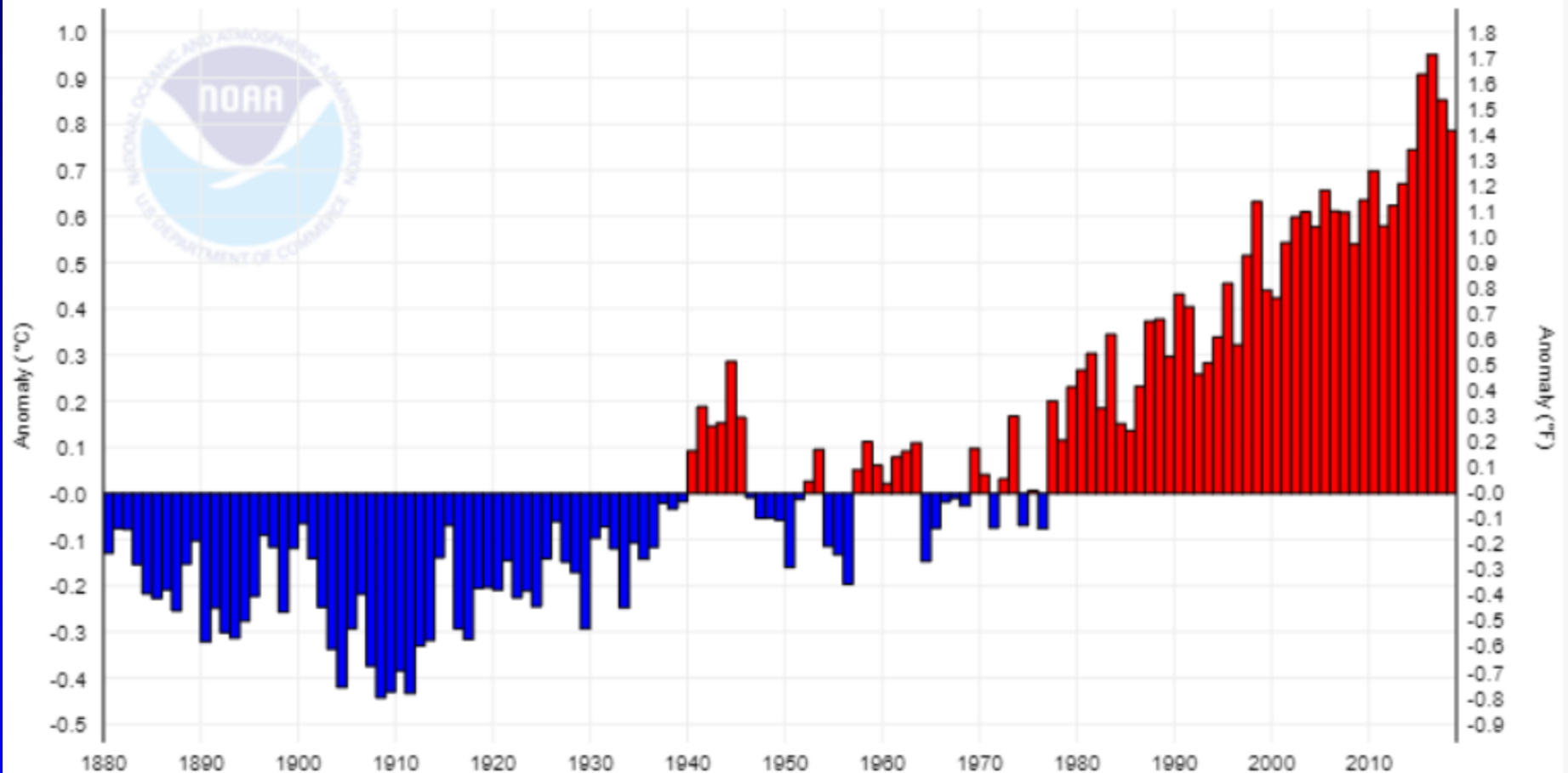


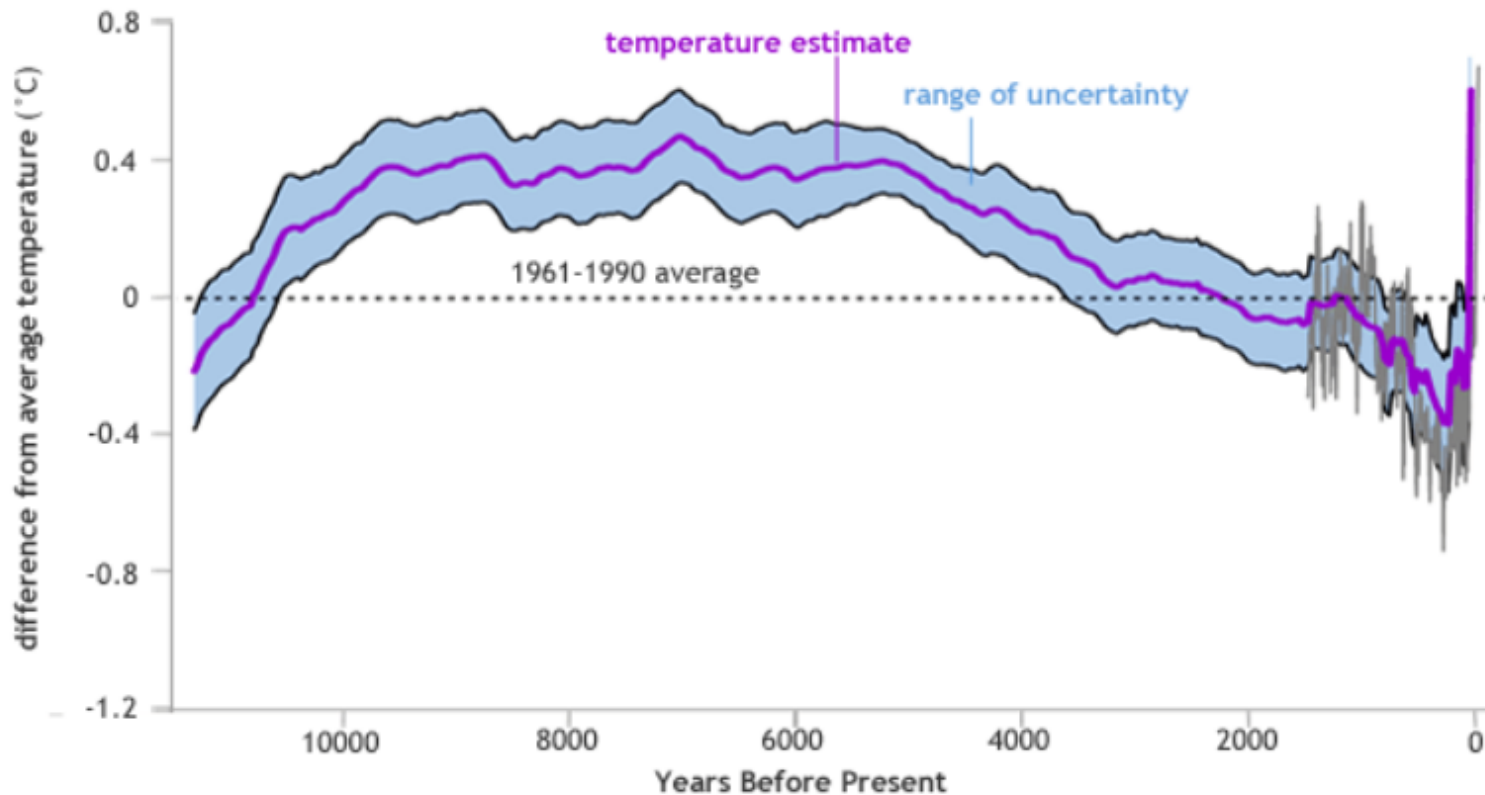
# Joint Statement of AFS/TWS

- *“If we are to safeguard our own wellbeing as a species, it is imperative that the scientific underpinnings of fish and wildlife conservation and management are heard and used to find solutions.”*

# Peer Reviewed Data and Studies

Global Land and Ocean Temperature Anomalies, January-December





Global temperature anomalies over the past 11,300 years compared to historic average (1961-1990). The purple line shows the annual anomaly, and the light blue band shows the statistical uncertainty (one standard deviation). The gray line shows temperature from a separate analysis spanning the past 1,500 years. Image adapted from Figure 1(b) in Marcott et al.

Marcott, S. A., J. D. Shakun, P. U. Clark, and A. Mix. 2013. A Reconstruction of Regional and Global Temperature for the Past 11,300 Years. *Science* 339(1198).

# nature

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NATURE | NEWS



## Global temperatures are close to 11,000-year peak

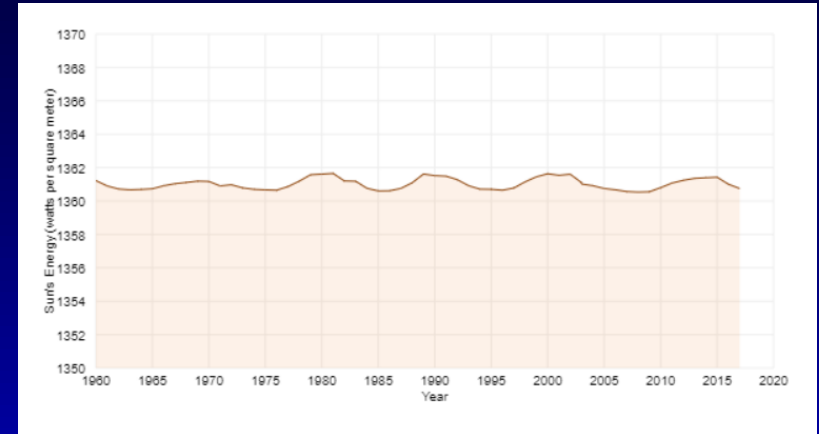
Planet is set to get hotter than at any time since last ice age by end of century.

**Sid Perkins**

07 March 2013

# What is related to current climate change?

Not incoming energy  
from the sun...



From NOAA website (<https://www.climate.gov/news-features/understanding-climate/climate-change-incoming-sunlight>) Data courtesy of Greg Kopp, Laboratory for Atmospheric and Space Physics, University of Colorado; and Judith Lean, Space Science Division, Naval Research Laboratory.

Not volcanic activity...

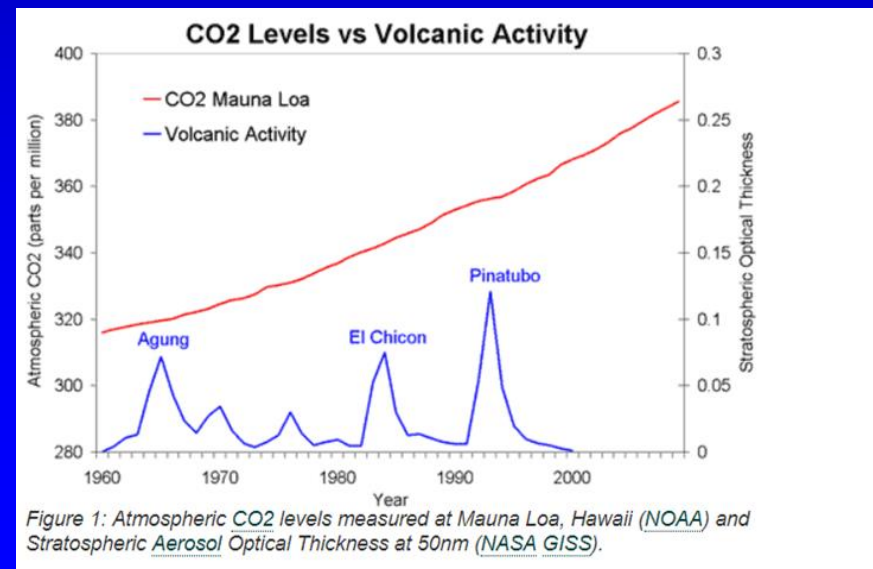
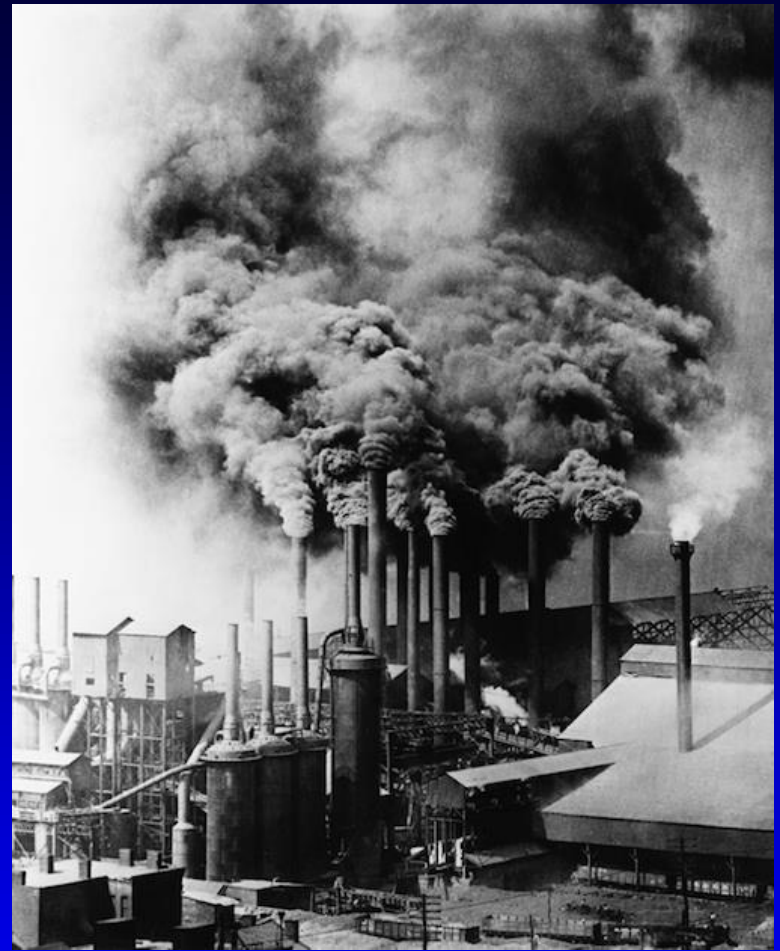
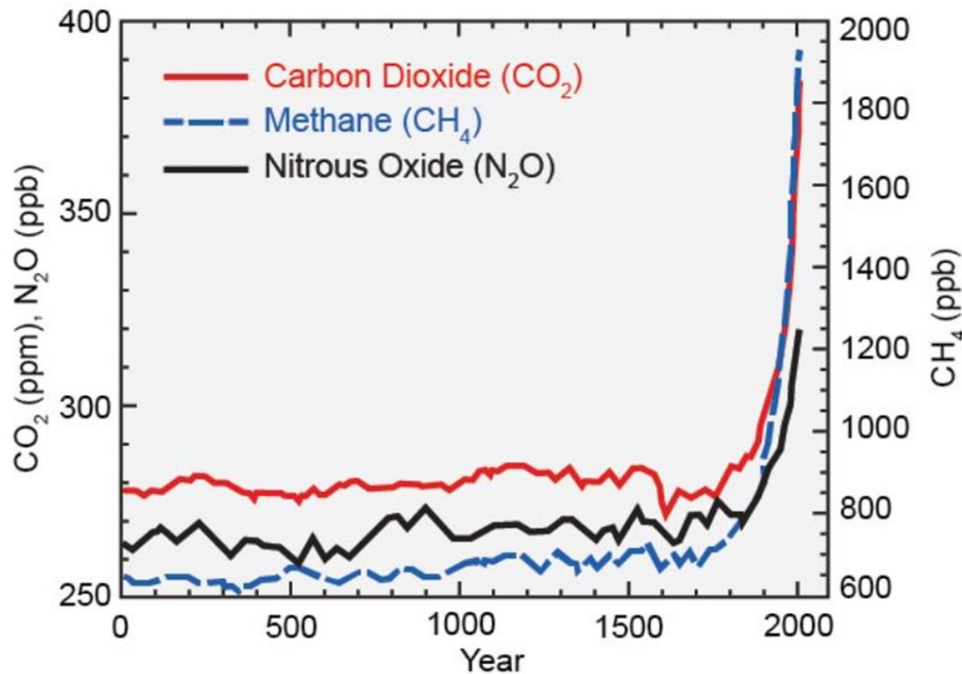


Figure 1: Atmospheric CO2 levels measured at Mauna Loa, Hawaii (NOAA) and Stratospheric Aerosol Optical Thickness at 50nm (NASA GISS).



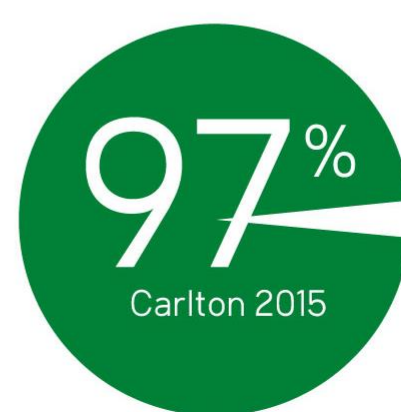
## It's human emissions of greenhouse gasses!



Climate Change 2007: The Physical Science Basis.  
Contribution of Working Group I to the Fourth Assessment  
Report (AR4) of the Intergovernmental Panel on Climate  
Change

Billions of tons of CO<sub>2</sub>  
pumped into atmosphere  
since industrial revolution

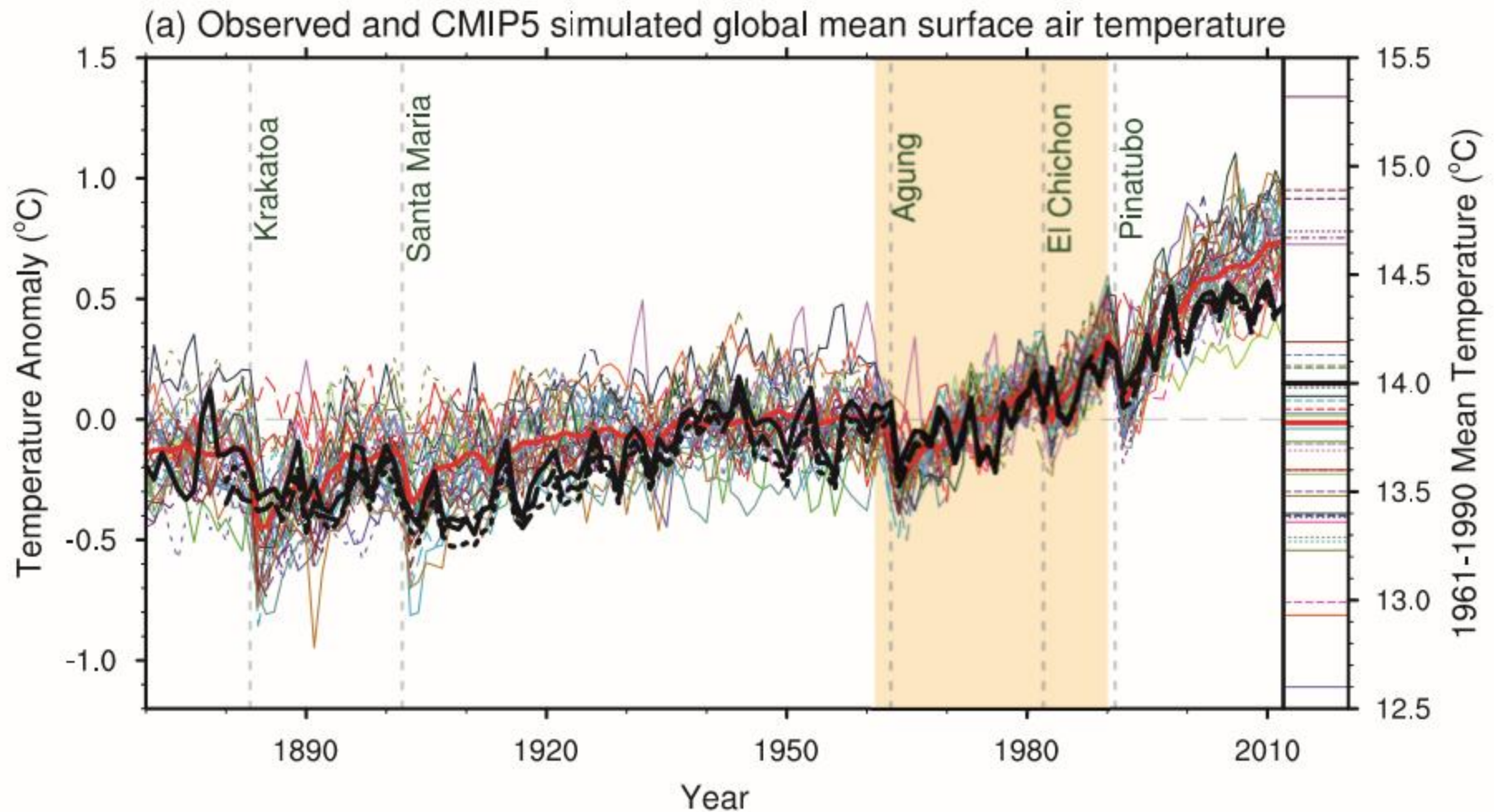
**Overwhelming consensus of climate scientists who have published peer-reviewed climate research, or peer-reviewed climate papers that human-caused climate change is occurring.**



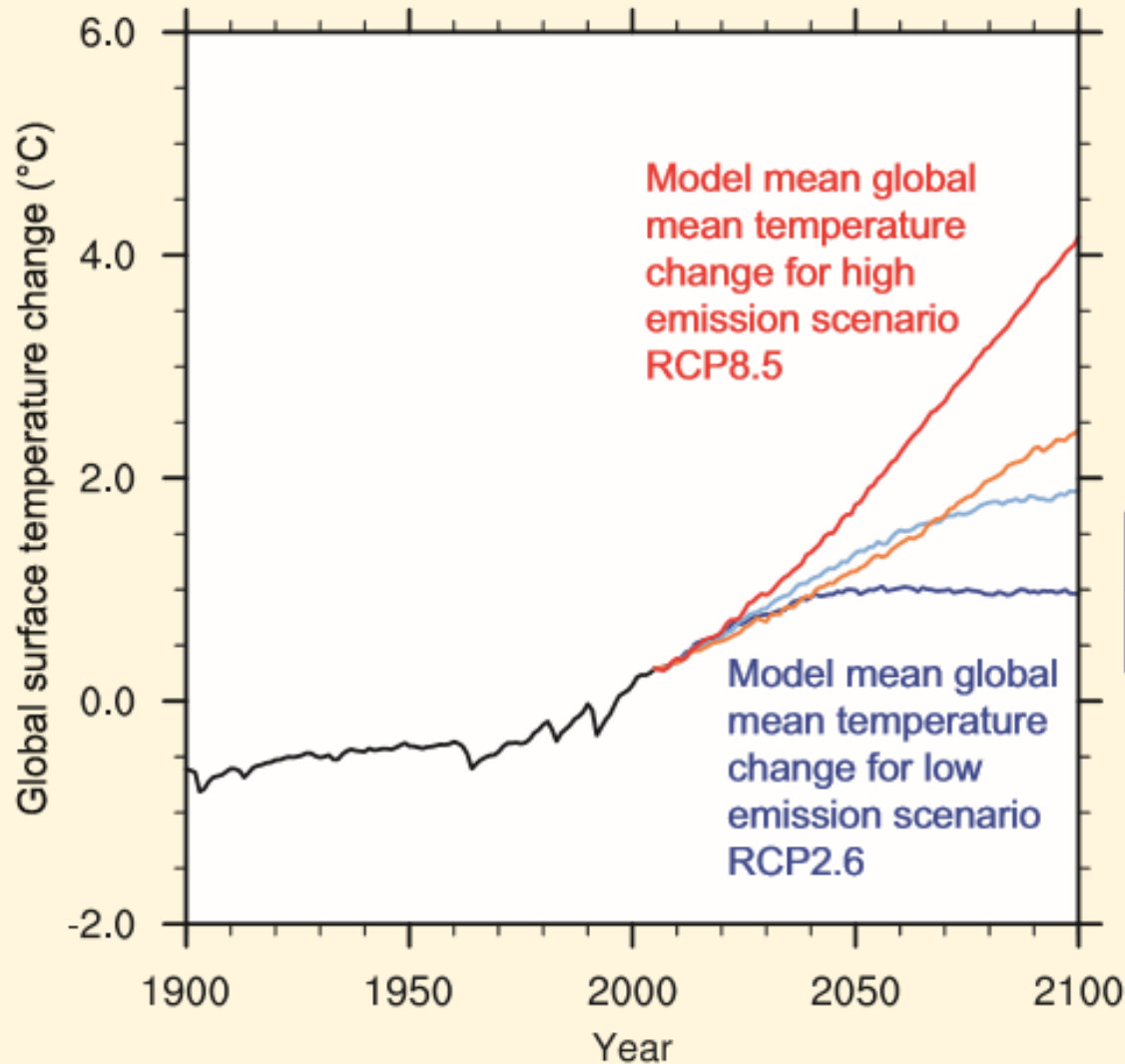
John Cook et al. 2016. Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. *Environ. Res. Lett.* 11 048002



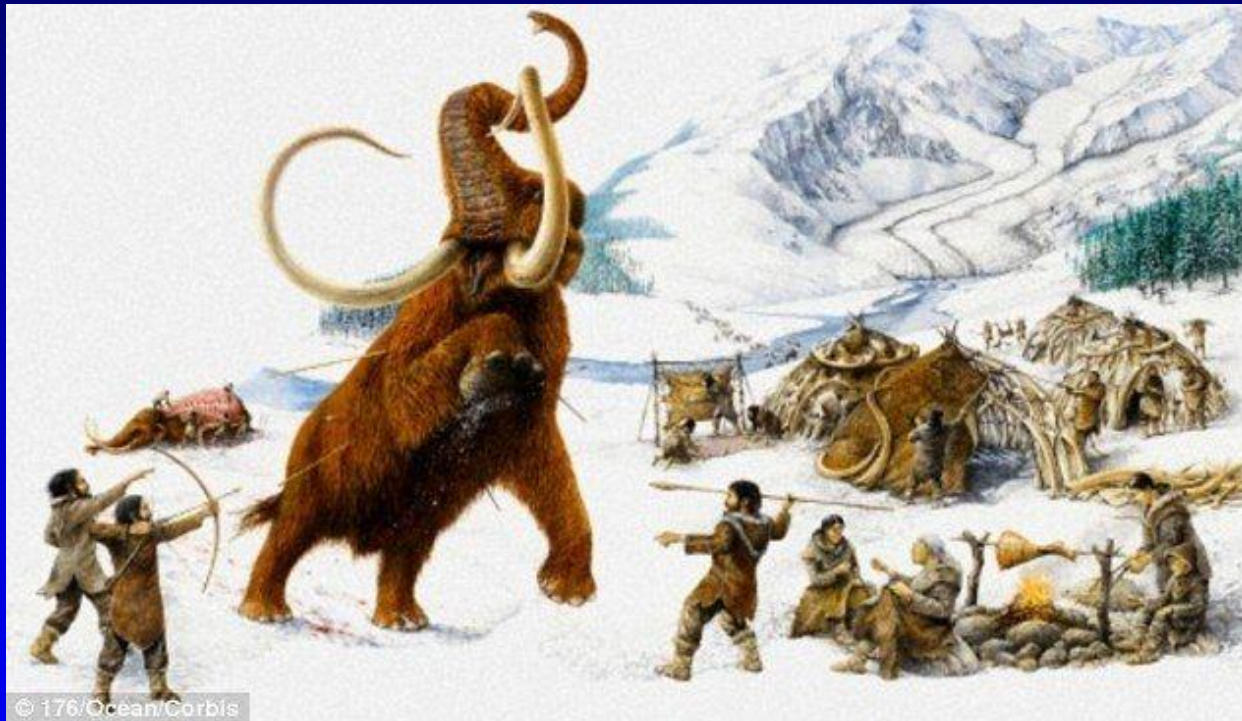
# Models fit historic data well



...and predict a dire future unless emissions reduced



Is a 1.5-5.5°C (2.7-9.9°F) change to global temperature a lot?



Global mean surface temperature was 4-9°C (7-16°F) colder in last ice age...

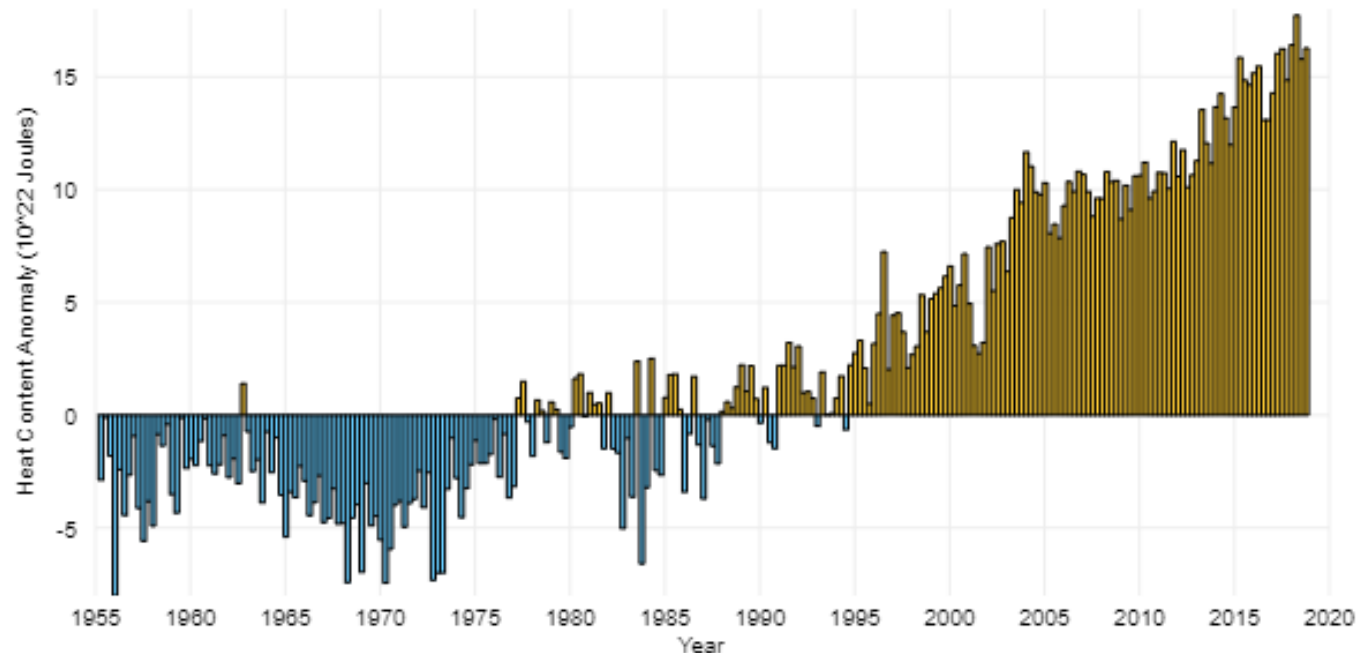
# ...Once committed, there is no going back

>90% of warming in the last 50 years has occurred in ocean

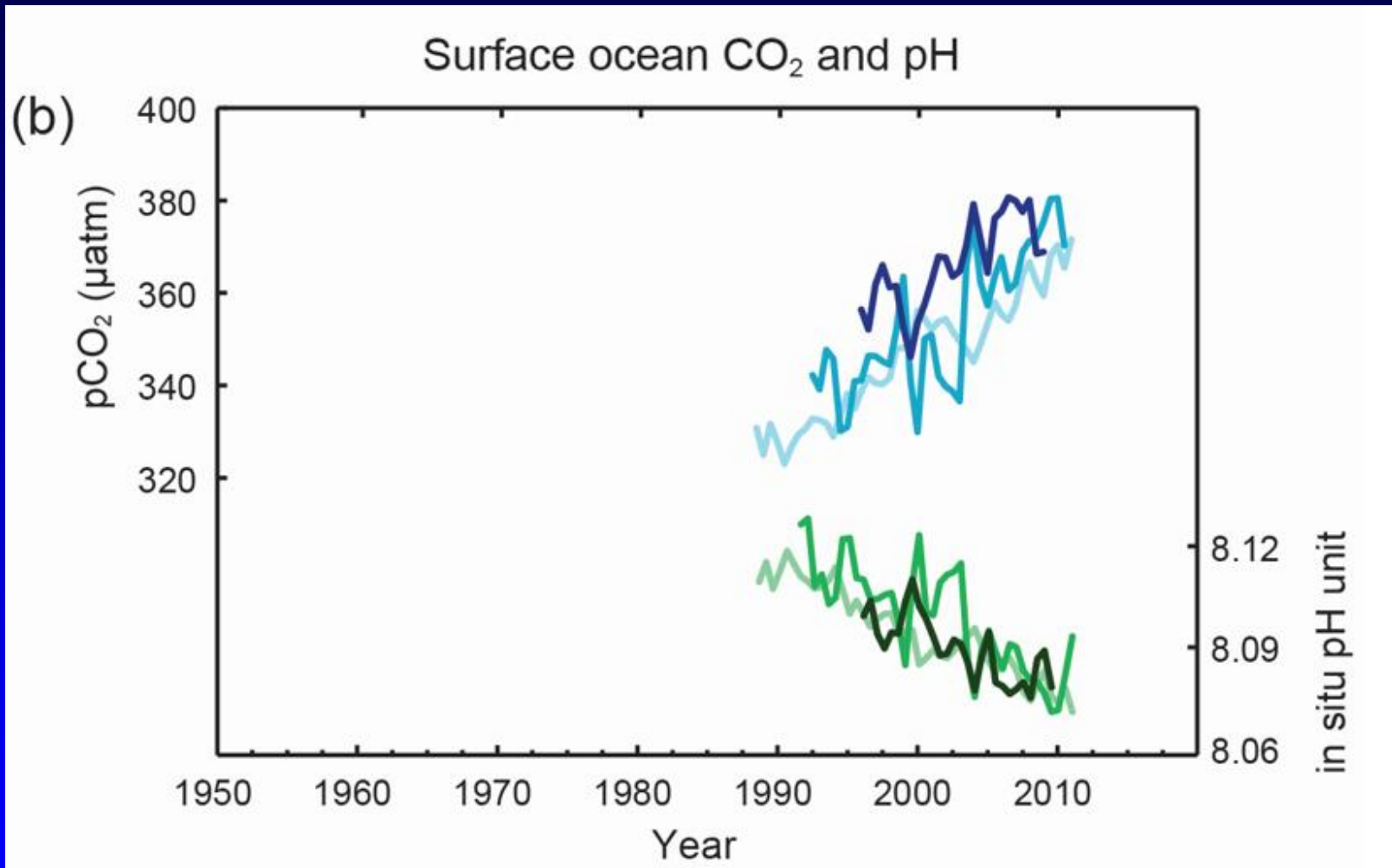
Heat stored in ocean eventually released, committing earth to additional warming in future



From NOAA,  
<https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content>



## Added CO<sub>2</sub> also increases ocean acidity

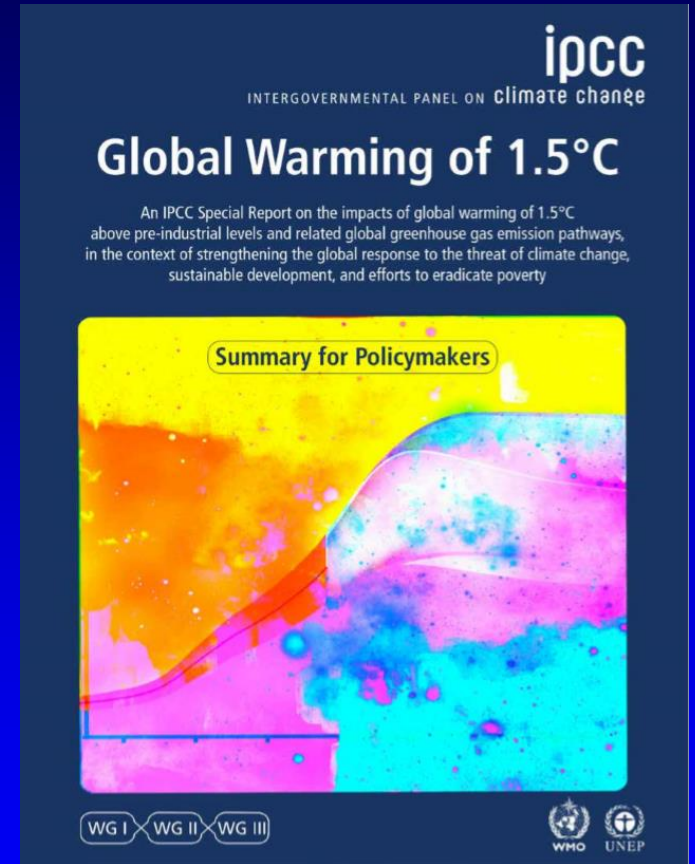


IPCC, 2013: Climate Change  
2013: The Physical Science  
Basis.



# What to do?

- “Avoiding overshoot (of 1.5°C) and reliance on future large-scale deployment of carbon dioxide removal (CDR) can only be achieved if **global CO2 emissions start to decline well before 2030.**”<sup>1</sup>



IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C.

<sup>1</sup>underline and bold added.